

Patent claims

1. A method for the production of nanoscale particles having a so-called core and at least one so-called shell, wherein nanoscale particles of an inorganic material having a particle size of < 100 nm are used as the core, and at least one metal is applied as the shell to these particles forming the core, in solution or in suspension, by a radiation-induced redox reaction.
2. The method as claimed in claim 1, characterized in that the redox reaction is induced by UV radiation.
3. The method as claimed in claim 1 or claim 2, characterized in that the metal is copper or silver.
4. A method for the production of nanoscale particles having a so-called core and at least one so-called shell, wherein nanoscale particles of a magnetic material having a particle size of < 100 nm are used as the core, and at least one inorganic material is applied as the shell to these particles forming the core, in solution or in suspension, by means of a pH change brought about by at least one enzyme.
5. The method as claimed in claim 4, characterized in that the pH change is brought about by decomposition of urea by means of urease.
6. The method as claimed in claim 4 or claim 5, characterized in that the magnetic material is iron oxide, preferably magnetite.
7. The method as claimed in any of the preceding claims, characterized in that the solvent is

removed after the application of the shell and, preferably, the powder thus obtained is calcined.

- 5 8. The method as claimed in any of the preceding claims, characterized in that the inorganic material comprises nanoscale oxide, sulfide, carbide or nitride powders, preferably nanoscale oxide powders.
- 10 9. The method as claimed in any of the preceding claims, in particular as claimed in claim 8, characterized in that the inorganic material has semiconductor properties.
- 15 10. The method as claimed in any of the preceding claims, in particular as claimed in claim 8 or claim 9, characterized in that the inorganic material is aluminum oxide, zirconium oxide, titanium oxide, iron oxide, cerium oxide, silicon
20 carbide or tungsten carbide.
11. The method as claimed in claim 10, characterized in that the inorganic material is aluminum oxide (Al_2O_3) or titanium oxide (TiO_2).
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12. A core/shell particle having a so-called core and at least one so-called shell,
- the core comprising nanoscale particles of an inorganic material having a particle size of
30 < 100 nm,
- the shell being at least one metal, and
- the core/shell particles being present substantially, preferably completely, as nonagglomerated particles.
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13. A core/shell particle having a so-called core and at least one so-called shell, which can be produced by the method as claimed in claim 1 or claim 2.

14. The core/shell particle as claimed in claim 12 or claim 13, characterized in that the inorganic material has semiconductor properties.
- 5 15. The core/shell particle as claimed in any of claims 12 to 14, characterized in that the inorganic material is a nanoscale oxide powder.
- 10 16. The core/shell particle as claimed in any of claims 12 to 15, characterized in that the inorganic material is titanium oxide (TiO₂).
- 15 17. A core/shell particle, characterized in that the metal is silver or copper.
18. A core/shell particle having a so-called core and at least one so-called shell,
- the core comprising nanoscale particles of a magnetic material having a particle size of
20 < 100 nm,
- the shell being at least one inorganic material, and
- the core/shell particles being present substantially, preferably completely, as
25 nonagglomerated particles.
19. A core/shell particle having a so-called core and at least one so-called shell, which can be produced by the method as claimed in claim 4 or
30 claim 5.
20. The core/shell particle as claimed in claim 18 or claim 19, characterized in that the magnetic material is iron oxide, preferably magnetite.
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21. The core/shell particle as claimed in any of claims 18 to 20, characterized in that the inorganic material is a nanoscale oxide powder.

22. The core/shell particle as claimed in any of claims 18 to 21, characterized in that the inorganic material is titanium oxide (TiO₂).
- 5 23. The core/shell particle as claimed in any of claims 12 to 22, characterized in that the nanoscale particles which form the core have a particle size between 5 nm and 50 nm, preferably between 5 nm and 20 nm.
- 10 24. The core/shell particle as claimed in any of claims 12 to 23, characterized in that the core/shell particles have a particle size between 5 nm and 100 nm, preferably between 10 nm and 15 50 nm, in particular between 20 nm and 45 nm.
- 20 25. The core/shell particle as claimed in any of claims 12 to 24, characterized in that they are applied to an inorganic or organic carrier or incorporated into an inorganic or organic matrix.
- 25 26. The use of the core/shell particles as claimed in any of claims 12 to 17 and 23 to 25 as biocides.
27. The use of the core/shell particles as claimed in any of claims 18 to 25 for wastewater treatment, in particular for removing heavy metals from wastewaters.